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Erhalten  
07. Apr. 2004  
Strehl et al.



Application No. 97 120 114.0 - 2211	Ref. EPA-36449	Date 06.04.2004
Applicant Hitachi, Ltd.		

16. May 04  
16. Juli 04

**Communication pursuant to Article 96(2) EPC**

The examination of the above-identified application has revealed that it does not meet the requirements of the European Patent Convention for the reasons enclosed herewith. If the deficiencies indicated are not rectified the application may be refused pursuant to Article 97(1) EPC.

You are invited to file your observations and insofar as the deficiencies are such as to be rectifiable, to correct the indicated deficiencies within a period

**of 4 months**

from the notification of this communication, this period being computed in accordance with Rules 78(2) and 83(2) and (4) EPC.

One set of amendments to the description, claims and drawings is to be filed within the said period on separate sheets (Rule 36(1) EPC).

**Failure to comply with this invitation in due time will result in the application being deemed to be withdrawn (Article 96(3) EPC).**



JOHANSSON U C  
Primary Examiner  
for the Examining Division

Enclosure(s): 7 page/s reasons (Form 2906)

**Bescheid/Protokoll (Anlage)**

Datum  
Date 06.04.2004  
Date

**Communication/Minutes (Annex)**

Blatt  
Sheet 1  
Feuille

**Notification/Procès-verbal (Annexe)**

Anmelde-Nr.:  
Application No.: 97 120 114.0  
Demande n°:

The examination is being carried out on the **following application documents**:

Text for the Contracting States:

AT BE CH LI DE DK ES FI FR GB GR IE IT LU MC NL PT SE

**Description, pages:**

1-31 as originally filed

**Claims, No.:**

1-9 as originally filed

**Drawings, sheets:**

1-10 as originally filed

1. The following documents (D1/D2), of which D1 is considered to represent the closest prior art teaching, are mentioned for the first time in this communication; the numbering will be adhered to in the rest of the procedure:

D1 = PATENT ABSTRACTS OF JAPAN, vol. 017, no. 348 (p-1566), 30 June 1993 (1993-02-06) & JP 05 046324 A (HITACHI LTD), 26 February 1993 (1993-02-26)

For convenience, the document D1' = US-A-5 734 812 will be referred to throughout the procedure in place of the aforementioned Japanese document. Said document D1' being the corresponding US Patent belonging to the same patent family as the aforementioned Japanese document, thus, representing a *de facto* translation of the same;

D2 = GB-A-2 305 275

2. The present set of claims does not meet the requirements of Rule 29(2) EPC and,



thus, is not allowable:

The present set of claims comprises more than one independent claim in the same category, i.e. three independent claims in the apparatus category (claims 1, 4 and 7).

Rule 29(2) EPC states that a European patent application may contain more than one independent claim in the same category only if the requirements laid down in its paragraphs (a), (b) or (c) are met.

In the present set of claims, however, none of these requirements is evidently met. In particular, it is noted that the conditions defined by Rule 29(2)(c) EPC are not fulfilled as the various definitions of the invention given in the three independent apparatus claims, in view of the technical features defined in the respective independent claim, do not represent alternative solutions to one and the same problem. On the contrary, the definitions of the invention given in the three independent apparatus claims merely define the same principle solution, though, on different levels of abstraction. Consequently, the present set of claims is not allowable as not meeting the requirements of Rule 29(2) EPC.

### 3. Lack of clarity, Article 84 EPC:

- 3.1. The present application does not meet the requirements of Article 84 EPC concerning clarity as a direct consequence to the existence of multiple independent claims in the apparatus category, where said independent claims defines the invention in terms of distinct sets of technical features.

The various definitions of the invention given in the various independent claims presently on file are such that the claims as a whole are not clear and concise, contrary to Article 84 EPC. As to conciseness, reference is made to the Guidelines C.III, section 5.1 in respect to the established practice that the requirement of conciseness applies not only to individual claims but also to the claims as a whole. Rule 29(5) EPC reinforces this conclusion. The lack of clarity derives from the consideration that the prime function of the claims is to make clear which are the essential technical features of the matter for which the protection is sought (cf. the



first sentence of Article 84 EPC). The various definitions of the invention given in the various independent claims of the present application leave the reader in doubt as to what are in fact the essential features of the invention and, hence, the primary purpose of Article 84 is not satisfied.

In the present case it is considered appropriate to use only one independent claim in any one category.

- 3.2. A further clarity objection is raised for the reason that the present independent claims 1 and 4 do not define all technical features considered essential to the performance of the invention, Article 84 EPC.

From the disclosure of the present invention together with the summary of various prior art teachings in the description of the present application, the problem to be solved by the present invention can be perceived to regard how to generate redundancy data in a RAID system so as to reduce the mechanical overhead suffered by read-modify approaches while also avoiding the dependency on write data length suffered by redundancy data generation in the disk drive using combined read/write heads.

This perceived problem to be solved also corresponds to the various objects of the invention identified by the applicant on page 7, line 18 - page 8, line 14.

Now, turning to the present independent claims 1 and 4, it is noted that these claims define the invention at an exaggeratedly abstract level. In short, these independent claims merely define the existence of multiple circuits for generating redundancy data (claim 1), said multiple circuits for generating redundancy data further being defined in present independent claim 4 as being located inside each disk drive and inside the disk control device, which are to be selectively used for redundancy data generation.

As a result, the definitions of the invention given in the independent claims 1 and 4 does are not sufficiently detailed to allow the skilled person to perceive how the invention is to be put in practice so as to overcome the aforementioned problem underlying the invention. It follows that the subject-matter of the present



independent claims 1 and 4 does not define all technical features essential to the performance of the invention, contrary to the requirements of Article 84 EPC.

3.3. Present independent claim 1 lacks clarity for the reason that the wording "in the different methods" used therein is ambiguous as the term "different methods" lacks any antecedent basis. The scope of said independent claim 1 as a whole is thereby rendered obscure, contrary to Article 84 EPC.

3.4. Present dependent claims 5 and 6 both lacks clarity for the reason that the terms "first redundancy generating circuit and "second redundancy generating circuit" referred to therein lack any antecedent basis. The respective scope of said dependent claims 5 and 6 as a whole is thereby rendered obscure, contrary to Article 84 EPC.

4. Lack of novelty, Articles 52(1) and 54 EPC:

The present application does not meet the requirements of Articles 52(1) and 54 EPC for the reason that the subject-matter of the present independent claims 1 and 4 lacks novelty in view of the teaching of D1':

4.1. Using the structure of the present independent claim 4 and with reference signs as defined in D1', the document D1' discloses (see column 3, lines 17-45; column 4, lines 22-30, line 48 - column 5, line 5; column 10, line 54 - column 12, line 32; Figures 1,2):

A disk array device comprising a plurality of disk drives (1304) for saving data to be transmitted to a host system (1300) via a disk control device (1305), said disk control device (1305) responsible for controlling the data transfer between the disk drives (1304) and the host system (1300), whereby write data is saved across a subset of the plurality of disk drives (1304) as parity groups comprising data and parity data generated from said write data and where each of said disk drives (1304) contains a redundant data generating circuit (100) comprising a parity generation circuit (208) for generating parity data either individually (full parity) or on the basis of a received intermediate parity (208) generated by and transmitted from the disk control device (1305), said disk control device (1305) being provided



with a redundant data generation circuit (201;202) and being responsive to select either one of the redundant data generating circuits inside the disk drives inside the disk control unit, or both (partial parity generation).

From the recitation of the teaching of D1' above, it is clear that the subject-matter of the present independent claim 4 is fully anticipated by the teaching of D1'. The subject-matter of present independent claim 4, thus, does not meet the requirements set forth by Articles 52(1) and 54 EPC concerning novelty.

- 4.2. Concerning the subject-matter of the present dependent claim 1, it is noted that the technical features defined therein regard a subset of the technical features defined in present independent claim 4, which was found to lack novelty in view of D1' in section 4.1 above.

Accordingly, for the same reasons as given for present independent claim 4 in section 4.1 above, also the subject-matter of present independent claim 1 lacks novelty in view of D1', Articles 52(1) and 54 EPC.

- 4.3. With reference to the passages of D1' mentioned in section 4.1 above, it is clear that the selection of the various parity redundancy circuits inside the control unit or the parity generation circuit inside the respective disk drive, or both, is dependent on whether undivided distribution or divided distribution is employed, which decision, in turn, to the skilled person typically is in consequence to the length of the write data. Thus, the features of present dependent claim 2 is considered to be implicitly disclosed in D1', wherefore said claim 2 lacks novelty in view of D1', Articles 52(1) and 54 EPC.

5. Lack of inventive step, Articles 52(1) and 56 EPC:

With reference to the subject-matter of the present dependent claims 3, 5 and 6, with due account taken of the clarity objections raised in section 3 above, the examiner has not been able to identify any specific matter of these dependent claims, which would comply with the requirements set forth by Article 52(1), 54 and 56 EPC concerning both novelty and inventive step.



On the contrary, the subject-matter of the present dependent claims 3, 5 and 6 merely regards various straightforward implementation details representing possible design alternatives, which, to the extent that these are not directly derivable from the teachings of D1'/D2, are all well within the reach of a skilled person without resorting to any inventive skills. This, as the inclusion of any one(s) of the technical feature(s) comprised in said dependent claims into the teaching of D1' is not to be associated with any surprising effect and, thus, merely representing a straightforward extrapolation of known features.

6. Further formal deficiencies of the present application:

- 6.1. In order to meet the requirements of Rule 27(1)(b) EPC, the prior teachings of D1 (i.e. the Japanese document JP-A-05 046324) and D2 should be acknowledged in the description.

To this end, it is also noted that the reference to a prior art document on page 1, lines 9-12 comprises spelling mistakes and also does not easily allow said document to be traced by the public. Said reference to the prior art document should be amended to read:

"David A. Patterson ET AL.: "A Case for Redundant Arrays of Inexpensive Disks (RAID)", UNIVERSITY OF CALIFORNIA REPORT, 01.12.1987, pages 109-116, XP000577756"

- 6.2. Reference signs in parentheses should be inserted in the claims to increase their intelligibility, Rule 29(7) EPC. This applies to both the preamble and characterising portion.
- 6.3. The statement on page 29, lines 14-19 comprises a vague reference to the invention, thereby rendering the scope of the same ambiguous, Article 84 EPC. In particular, the wording "without departing from the spirit of the invention" is objected against. The statement should, thus, be deleted (see also the EPO GL, C.III, 4.3a).
- 6.4. The following clerical mistakes, to which remedy is required, have been noted:



- page 10, line 15: one occurrence of the word "an" should be deleted;
- claim 4, last paragraph: the word "user" should correctly read "use";
- claim 8, line 4: one occurrence of the word "second" should be deleted;
- Figure 8: the word "genevator" in item 130 should correctly read "generator";
- Figure 9: the word "genevator" in item 140 should correctly read "generator".

7. When filing a new set of claims, the applicant must bring the description into conformity with the new claims to be filed, Rule 27(1)(c) EPC; care should be taken during revision, especially of the introductory portion including any statements of problem or advantage, not to add subject-matter which extends beyond the content of the application as originally filed, Article 123(2) EPC. The applicant is thereby requested to indicate the support in the application as filed for each amendment made.

With his letter, the applicant is requested to indicate the differences between any new independent claim to be filed with respect the known prior art teachings. He should then also, by adopting a problem-solution approach, provide convincing arguments regarding why such a difference with respect to the known prior art documents, in particular with respect to the teachings of D1' and D2, would not be regarded as obvious by a person having skills in the relevant technical field.

U. Johansson  
Primary Examiner